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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|-----------------------|---------------------------|------------------|
| 10/604,242 | 07/03/2003 | Ravikumar Kudaravalli | GEMS0204PA | 1241 |
| 27256 | 7590 | 12/21/2004 | EXAMINER | |
| ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034 | | | DOERRLER, WILLIAM CHARLES | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3744 | |

DATE MAILED: 12/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------|--|--|
| Office Action Summary | Application No. 10/604,242 | Applicant(s) KUDARAVALLI, RAVIKUMAR | |
| | Examiner William C Doerrler | Art Unit 3744 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-15 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 16, 18 and 20 is/are rejected.
- 7) ☒ Claim(s) 7, 17 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7-3-2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5,8,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuck et al in view of Bartlett.

Schuck et al disclose applicant's basic inventive concept, a cooling system for an MRI system which circulates helium using a compressor 20 and precools the helium using nitrogen which is vented (at 42), substantially as claimed with the exception of using a regenerative heat exchanger to cool the incoming stream using an exiting stream.

Bartlett shows this feature to be old in the cryogenic cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention from the teaching of Bartlett to modify the cooling system of Schuck et al by using a regenerative heat exchanger to improve the efficiency of the system by transferring heat from a refrigerant entering the cold sink using refrigerant whose energy (coldness) might otherwise be wasted.

Claims 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuck et al in view of Bartlett as applied to claims 1-5,8,16 and 18 above, and further in view of any one of Agrawal et al '516, Alexeev et al or Acharya et al.

Schuck et al, as modified, discloses applicant's basic inventive concept, a cryogenic cooling system which uses a second cryogen (nitrogen to cool a first cryogen (helium) which is circulating through an MRI machine, substantially as claimed with the exception of using a precooler which cools the circulating first refrigerant using an ambient heat sink. Agrawal et al '516, Alexeev et al and Acharya et al each show this feature to be old in the cryogenic cooling art. It would have been obvious to one of ordinary skill in the art from the teaching of Agrawal et al '516, Alexeev et al or Acharya et al to modify the cryogenic cooler of Schuck et al by adding an ambient heat exchanger to reduce the heat of the circulating coolant as much as possible using an economical heat sink. It is noted that the recirculating coolant of the Agrawal et al '516, Alexeev et al or Acharya et al references is compressed at basically room temperature, so the temperature entering the compressor (or leaving any regenerative heat exchanger) will be close to room temperature.

Allowable Subject Matter

Claims 7,17 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 9-15 are allowed.

Response to Arguments

Applicant's arguments filed 11-24-2004 have been fully considered but they are not persuasive. Barlett shows the regenerative heat exchanger between the blower 23

and the magnet 7. Barlett also shows the lowest temperature heat exchangers (35 and 37) between the first regenerative heat exchanger and the magnet. This is seen as a teaching that colder heat exchangers (such as the pre-cooler assembly shown by Schuck et al) should be placed between the magnet and warmer regenerative heat exchangers. The heat exchangers of Bartlett which cool the coolant entering the magnet will necessarily heat the other flow path which inherently then heats the fluid entering the blower. The age of the references is immaterial. Since the chosen references render the current claims unpatentable, they would have rendered the same claims unpatentable if presented earlier. Claims 6 and 20 do not claim that heat is transferred to room temperature ambient, merely that the heat exchanger achieves "substantially room temperature". This is seen as being taught by the references, particularly since Bartlett does not state the temperature of the gas leaving heat exchanger 31 for the compressor.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

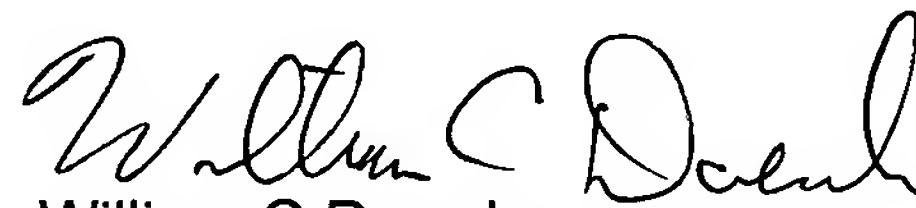
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C Doerrler whose telephone number is (571) 272-4807. The examiner can normally be reached on Monday-Friday 6:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise Esquivel can be reached on (571) 272-4808. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William C Doerrler
Primary Examiner
Art Unit 3744

WCD